Name:

at1121exam_practice: Radicals and Squares (v603)

Question 1

Simplify the radical expressions.

$$\sqrt{20} \qquad\qquad \sqrt{18} \qquad\qquad \sqrt{45}$$

$$\sqrt{2 \cdot 2 \cdot 5} \qquad\qquad \sqrt{3 \cdot 3 \cdot 2} \qquad\qquad \sqrt{3 \cdot 3 \cdot 5}$$
$$2\sqrt{5} \qquad\qquad 3\sqrt{2} \qquad\qquad 3\sqrt{5}$$

Question 2

Find all solutions to the equation below:

$$2(x+8)^2 - 4 \;=\; 68$$

First, add 4 to both sides.
$$2(x+8)^2 = 72$$

Then, divide both sides by 2.
$$(x+8)^2 = 36$$

Undo the squaring. Remember the plus-minus symbol.

$$x + 8 = \pm 6$$

Subtract 8 from both sides.
$$x = -8 \pm 6$$

So the two solutions are $x = -2$ and $x = -14$.

Question 3

By completing the square, find both solutions to the given equation. *You must show work for full credit!*

$$x^2 + 14x \;=\; 95$$

$$x^2 + 14x + 49 = 95 + 49$$
$$x^2 + 14x + 49 = 144$$
$$(x + 7)^2 = 144$$
$$x + 7 = \pm 12$$
$$x = -7 \pm 12$$
$$x = 5 \qquad \text{or} \qquad x = -19$$

Question 4

A quadratic polynomial function is shown below in standard form.

$$y \;=\; 4x^2 + 40x + 93$$

Express the function in **vertex form** and identify the **location** of the vertex.

From the first two terms, factor out 4 .

$$y = 4(x^2 + 10x) + 93$$

We want a perfect square. Halve 10 and square the result to get 25 . Add and subtract that value inside the parentheses.

$$y = 4(x^2 + 10x + 25 - 25) + 93$$

Factor the perfect-square trinomial.

$$y = 4((x + 5)^2 - 25) + 93$$

Distribute the 4.

$$y = 4(x + 5)^2 - 100 + 93$$

Combine the constants to get **vertex form**:

$$y = 4(x + 5)^2 - 7$$

The vertex is at point $(-5, -7)$.